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NEWER PARAMETERS OF THE SOMATIC DEVELOPMENT OF 3—19 YEARS OLD HUNGARIAN CHILDREN AND TEENAGERS

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Abstract

A review is given of the percentile values and graphs used in medical practice, based on the somatic studies performed by the author between the years 1981 and 1984. The reviewed parameters are suitable for controlling the somatic development of youths of appropriate age. The somatic data within the interval ranging from the percentile values of 3 to 97 are indicative of the normal somatic development.
Key words: Hungarian youths, somatic development, standards

Introduction

The controlling of somatic development in the first twenty years following birth is of particular importance. To realize this, however, adequate standards are required.

In general, somatic development is examinde by determining the body height, body weight and normal chest circumference. The somatometric data of a youth can be compared to such tables of physical development which were prepared with the consideration of two parameters — arithmetic mean ($\bar{x}$) and standard deviation (s) — of the corresponding body measures of a child group being of the same age and sex.

In case of the youths of a population, the mentioned tables of somatic development should meet the following requirements:

— The tables of somatic development should be constructed on the basis of the studies of the population to which the youth in question belongs. In such way realistic results cannot be obtained from a comparison between the body measures of the Hungarian youths and the American standards (VÉGHELYI, 1975).

— Since the somatic development of the youths is influences by the social-economical changes, as environmental factors (BERNHOLDT-THOMSEN, 1942; KÁDÁR and VÉLI, 1974; VÉLI, 1948, 1967, 1974), the tables should be checked periodically. Several tables of development were prepared in Hungary previously and these were used throughout the country (EIBEN, 1967; KAROSSA-PFEIFFER and MELLY, 1959;

M. VIOLA, 1952). According to the foregoings these evidently no further meet the requirements.

— When determining the normal values (standards) of somatic development, a method satisfying the practical requirements should be used. This can be obtained by determining either the $\bar{x} \pm 1{,}96.s$ interval, or the appropriate percentile values.

Material and method

The large data collection accomplished between 1981 and 1984 (FARKAS et al. 1983) made it possible to construct a new table of somatic development.

The body weight, body height and normal chest circumference of the youths were determined according to the method of MARTIN (MARTIN and SALLER, 1956). The age was defined by R-55 type computer using the decimal table (FARKAS et al. 1983) and the parameters were calculated according to half-year age-groups.

Tables containing the 3, 25, 50, 75 and 97 percentiles were prepared for the three body measures (Table 1), based on which the growth graphs were also drawn (Figs. 1. — 6.).

Discussion

Due to the fact that the reviewed tables and graphs concern about 50 thousand youths, who — even if not in even distribution — live at the most varied settlements of Hungary, we find our data — especially those pertaining to the youths between the age 10 — 18 — characteristic to the Hungarian children.

The measurements were taken by the same person with the same instruments throughout the whole period of the data collection. Accordingly, the deviations between the arithmetic means of the age-groups and sexes cannot be explained by various techniques. The abnormal deviations occurring at the lowest and highest age-groups (the mean of youths belonging to the older age-groups is lower as compared to the younger ones) can be interpreted by the so-called cross-sectional study character of the data collection. Taking every aspect into consideration — according to our judgement — the reported tables and graphs of development meet the afore-mentioned requirements, thus they are recommended for use in case of the Hungarian children. At the same time, in case of the youths of Hungary as well as other populations being of identical age and sex, the somatic development becomes comparable with the help of the calculated parameters.

Table 1. Percentiles of body height, body weight and normal chest circumference between the ages of 3—19

Percentiles (boys)					Age (years)	Percentiles (girls)				
3	25	50	75	97		3	25	50	75	97
					3					
91.2	95.7	98.1	100.5	105.1	cm	89.8	94.4	97.0	99.5	104.3
12.8	14.7	15.7	16.7	18.7	kg	11.2	14.0	15.5	17.0	19.8
48.7	51.4	52.9	54.3	57.1	cm	46.4	50.2	52.3	54.4	58.3
					3.5					
91.4	96.7	99.6	102.4	107.8	cm	91.3	96.0	98.5	101.0	105.7
12.5	14.6	15.8	16.9	19.0	kg	12.2	14.3	15.4	16.5	18.7
48.5	51.1	52.6	54.0	56.6	cm	47.1	50.0	51.5	53.0	56.0
					4					
95.6	100.9	103.8	106.6	112.0	cm	95.9	100.7	103.4	105.9	110.8
13.0	15.9	17.5	19.0	22.0	kg	12.5	15.4	17.0	18.5	21.5
48.8	52.2	54.1	55.9	59.4	cm	47.3	50.7	52.6	54.4	58.0
					4.5					
94.0	102.5	107.2	111.7	120.5	cm	98.4	103.1	105.8	108.2	113.1
14.2	16.8	18.3	19.7	22.4	kg	13.1	16.0	17.6	19.2	22.2
50.0	53.0	54.7	56.3	59.4	cm	48.0	51.5	53.3	55.1	58.6
					5					
100.2	106.6	110.1	113.5	120.0	cm	101.3	106.8	109.8	112.7	118.4
13.7	17.2	19.1	21.0	24.5	kg	13.6	17.1	19.1	20.9	24.5
49.7	53.4	55.5	57.4	61.2	cm	48.7	52.5	54.6	56.6	60.5
					5.5					
104.1	109.5	112.5	115.3	120.9	cm	104.6	110.1	113.2	116.1	121.8
15.2	18.2	19.9	21.5	24.7	kg	14.5	18.3	20.3	22.3	26.2
51.1	54.2	55.9	57.6	60.8	cm	48.8	53.2	55.6	57.9	62.4
					6					
108.6	113.6	116.4	119.1	124.3	cm	105.9	112.3	115.8	119.1	125.6
16.0	19.5	21.4	23.2	26.7	kg	15.0	19.0	21.3	23.5	27.6
51.5	55.0	57.0	58.9	62.5	cm	49.6	54.0	56.3	58.6	63.1
					6.5					
108.5	114.5	117.8	121.0	127.2	cm	107.6	131.8	117.3	120.6	127.0
16.3	19.9	21.9	23.8	27.5	kg	12.9	18.3	21.2	24.1	29.6
51.8	55.5	57.5	59.5	63.3	cm	49.4	54.0	56.6	59.1	63.9
					7					
110.4	117.4	121.3	125.0	132.2	cm	110.1	117.1	121.0	124.7	131.8
15.8	20.9	23.7	26.3	31.5	kg	17.2	21.0	23.1	25.1	29.0
51.3	56.2	59.0	61.6	66.6	cm	51.0	55.3	57.7	60.0	64.4
					7.5					
114.5	121.0	124.7	128.1	134.8	cm	114.0	120.2	123.6	126.9	133.2
17.8	22.2	24.7	27.0	31.6	kg	16.6	21.7	24.5	27.2	32.4
53.5	57.5	59.6	61.7	65.7	cm	51.2	56.1	58.7	61.3	66.3
					8					
117.6	123.9	127.3	130.6	137.0	cm	116.5	122.7	126.2	129.5	135.8
18.4	23.5	26.3	29.0	34.3	kg	17.0	22.4	25.4	28.3	33.9
53.7	58.6	61.3	63.8	68.8	cm	51.3	56.7	59.6	62.4	67.7

Table 1. (Continuation 1.)

Percentiles (boys)					Age (years)	Percentiles (girls)				
3	25	50	75	97		3	25	50	75	97
					8.5					
118.9	126.1	130.1	133.9	141.3	cm	117.2	124.9	129.1	133.2	141.0
19.4	24.8	27.8	30.7	36.2	kg	17.9	23.8	27.1	30.3	36.4
55.0	59.8	62.4	65.0	69.9	cm	52.4	58.0	61.1	64.0	69.7
					9					
120.7	128.0	132.0	135.9	143.4	cm	119.0	127.3	132.0	136.4	145.0
19.2	25.3	28.7	31.9	38.2	kg	17.7	24.7	28.6	32.3	39.6
54.4	60.1	63.2	66.2	72.0	cm	51.9	58.5	62.2	65.7	72.4
					9.5					
122.6	130.5	134.9	139.0	147.1	cm	122.3	130.4	134.8	139.1	147.3
20.3	27.0	30.8	34.3	41.2	kg	17.8	26.3	30.9	35.4	44.1
55.0	61.0	64.4	67.5	73.7	cm	52.0	59.9	64.2	68.4	76.5
					10					
126.5	133.9	138.0	142.0	149.6	cm	125.9	134.2	138.8	143.2	151.7
20.8	28.6	32.9	37.0	45.0	kg	18.9	28.1	33.3	38.1	47.5
55.8	62.3	65.9	69.4	76.0	cm	52.6	60.9	65.5	69.9	78.4
					10.5					
129.4	137.0	141.1	145.2	152.9	cm	128.8	137.0	141.5	145.9	154.3
21.3	30.1	34.9	39.5	48.4	kg	21.2	30.3	35.3	40.1	49.4
56.1	63.1	67.0	70.7	77.9	cm	54.2	62.6	67.2	71.6	80.2
					11					
130.8	138.7	143.1	147.3	155.4	cm	131.2	139.7	144.5	149.0	157.7
22.4	31.4	36.3	41.1	50.3	kg	21.9	31.8	37.3	42.5	52.7
57.0	64.3	68.3	72.2	79.7	cm	55.1	64.1	69.0	73.8	82.9
					11.5					
133.0	141.2	145.7	150.1	158.5	cm	133.5	142.4	147.3	152.0	161.2
23.0	32.8	38.3	43.4	53.5	kg	22.6	33.5	39.6	45.5	56.7
57.7	65.3	69.6	73.7	81.5	cm	55.9	65.7	71.2	76.5	86.6
					12					
134.6	143.6	148.6	153.3	162.5	cm	137.0	145.8	150.7	155.3	164.3
24.1	34.7	40.5	46.1	56.9	kg	25.2	36.4	42.6	48.5	60.0
58.5	66.7	71.2	75.5	83.9	cm	58.7	68.5	73.9	79.0	89.0
					12.5					
136.4	145.9	151.2	156.3	166.1	cm	140.5	148.9	153.5	157.9	166.6
24.7	36.2	42.5	48.6	60.3	kg	27.2	38.9	45.4	51.6	63.6
59.4	67.9	72.6	77.1	85.9	cm	61.0	71.1	76.7	82.0	92.3
					13					
139.5	149.5	155.1	160.4	170.8	cm	143.1	151.3	155.8	160.1	168.5
26.8	39.0	45.7	52.2	64.7	kg	30.0	41.0	47.0	52.8	64.0
61.3	70.0	74.8	79.4	88.2	cm	63.5	72.9	78.2	83.2	92.8
					13.5					
142.4	152.7	158.4	163.9	174.4	cm	145.5	153.4	157.8	161.9	170.0
28.5	41.1	48.2	54.9	67.9	kg	31.4	43.2	49.7	56.0	68.0
62.5	71.4	76.4	81.1	90.2	cm	65.2	75.2	80.7	85.9	96.1

Table 1. (Continuation 2.)

Percentiles (boys)					Age (years)	Percentiles (girls)				
3	25	50	75	97		3	25	50	75	97
					14					
146.0	156.4	162.2	167.7	178.4	cm	147.5	155.0	159.1	163.1	170.7
31.2	44.5	51.9	58.9	72.6	kg	34.3	45.1	51.1	56.8	67.9
64.8	74.0	79.0	83.9	93.3	cm	67.9	76.8	81.8	86.5	95.7
					14.5					
149.0	159.3	165.1	170.6	181.2	cm	148.5	155.7	160.0	163.6	171.1
33.9	47.0	54.3	61.2	74.6	kg	36.0	47.0	53.2	59.0	70.3
67.3	76.1	81.0	85.7	94.7	cm	69.7	78.8	83.9	88.7	98.1
					15					
152.8	162.5	167.8	172.9	182.9	cm	149.4	156.7	160.8	164.6	172.1
37.2	50.0	57.1	63.9	77.0	kg	37.9	48.5	54.3	59.9	70.8
69.9	78.4	83.1	87.6	96.4	cm	71.6	80.1	84.7	89.2	97.8
					15.5					
156.8	165.6	170.5	175.2	184.2	cm	149.7	157.0	161.0	164.8	172.2
39.8	52.6	59.7	66.4	79.5	kg	39.3	49.3	54.9	60.2	70.5
72.2	80.5	85.1	89.5	98.1	cm	72.5	80.7	85.3	89.6	98.1
					16					
158.4	166.9	171.6	176.2	184.9	cm	150.0	157.2	161.1	164.9	172.3
42.6	54.8	61.6	68.0	80.5	kg	39.9	50.0	55.6	60.9	71.2
74.2	82.1	86.5	90.7	98.8	cm	73.0	81.3	85.8	90.2	98.7
					16.5					
160.7	168.8	173.2	177.5	185.7	cm	149.4	157.1	161.4	165.5	173.4
43.5	56.7	64.1	71.1	84.6	kg	40.7	50.5	55.9	61.1	71.2
74.7	83.4	88.3	92.9	101.8	cm	74.0	81.8	86.1	90.2	98.1
					17					
160.9	169.0	173.4	177.7	186.0	cm	150.1	157.5	161.6	165.6	173.2
45.9	58.1	64.9	71.4	84.0	kg	41.4	51.0	56.3	61.3	71.1
76.7	84.7	89.1	93.3	101.5	cm	74.3	82.2	86.6	90.8	98.9
					17.5					
162.2	170.1	174.4	178.5	186.6	cm	150.2	157.7	161.8	165.8	173.5
47.3	59.2	65.7	72.0	84.1	kg	41.4	51.1	56.4	61.6	71.5
77.6	85.3	89.6	93.6	101.5	cm	74.5	82.5	86.9	91.2	99.4
					18					
162.6	170.9	175.5	179.9	188.4	cm	151.1	158.1	162.0	165.8	173.0
49.3	60.9	67.3	73.5	85.4	kg	41.2	51.0	56.4	61.6	71.7
79.2	86.3	90.2	93.9	101.2	cm	74.5	82.4	86.7	90.9	99.0
					18.5					
162.1	170.1	174.6	178.8	187.1	cm	149.5	157.1	161.4	165.4	173.3
48.9	59.7	65.6	75.3	82.4	kg	40.9	50.5	55.5	60.9	70.7
79.2	86.3	90.3	94.0	101.3	cm	74.0	81.9	86.3	90.5	98.7
					19					
159.6	167.7	172.2	176.5	184.8	cm	150.1	157.2	161.1	164.8	172.1
48.6	61.7	68.9	75.9	89.3	kg	41.3	51.7	57.5	63.0	73.7
80.0	88.7	93.6	98.2	107.1	cm	75.0	82.8	87.1	91.2	99.1

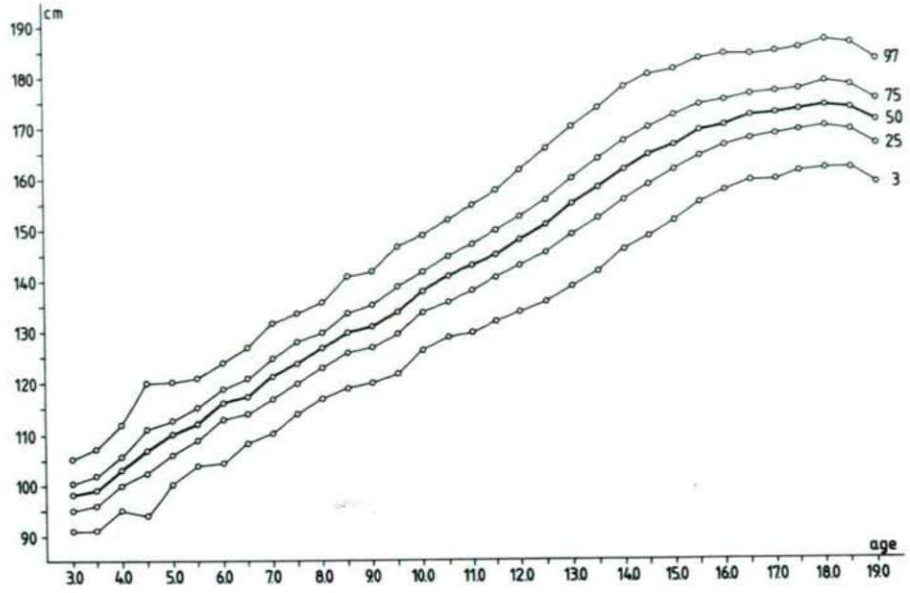

Fig. 1. Percentile curves of the stature of boys between the ages of 3 — 19

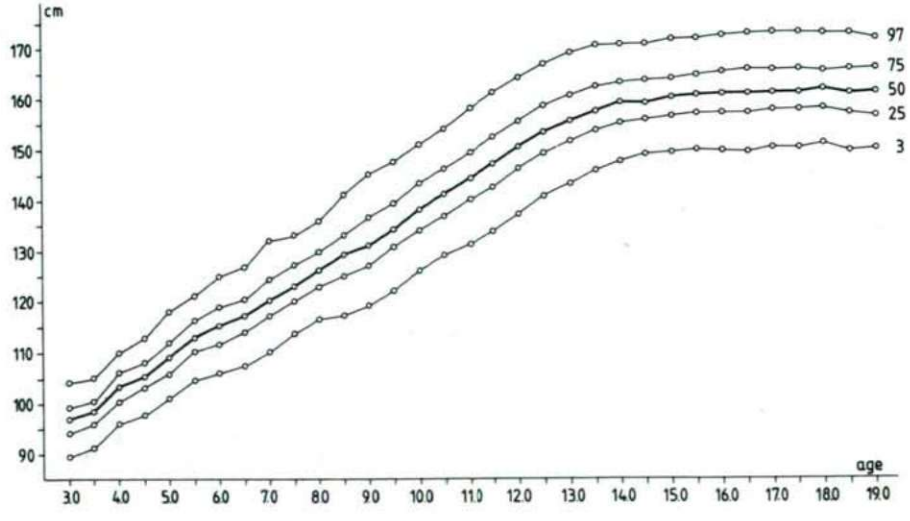

Fig. 2. Percentile curves of the stature of girls between the ages of 3 — 19

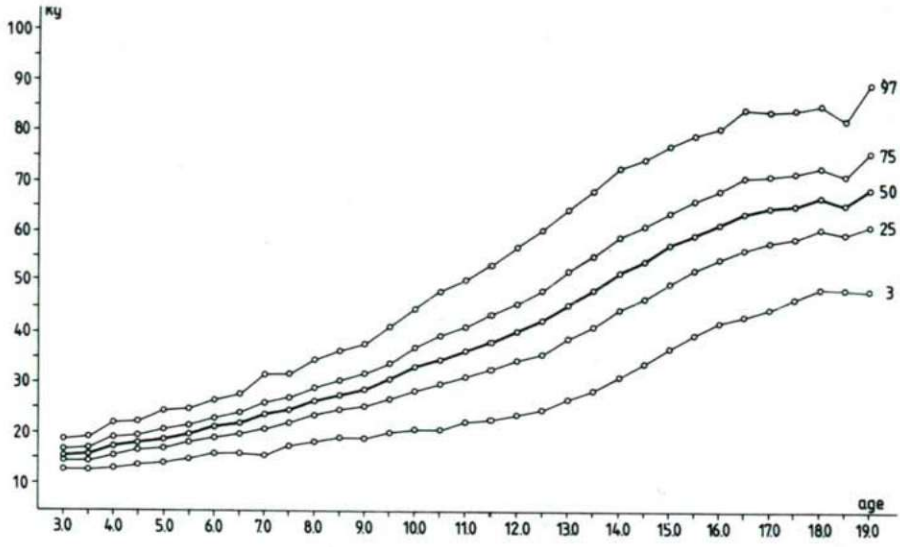

Fig. 3. Percentile curves of the body weight of boys between the ages of 3—19

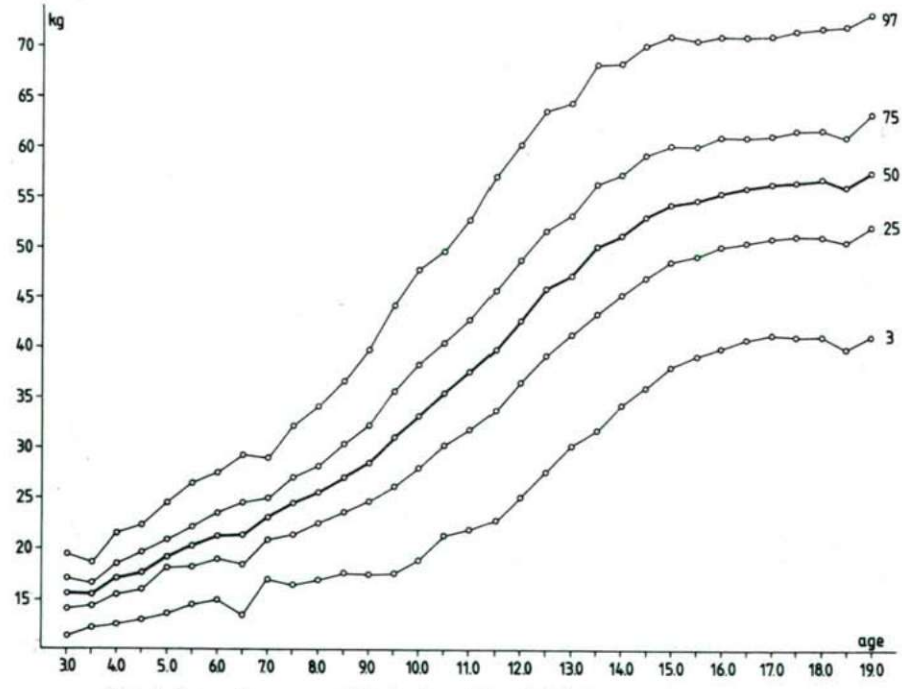

Fig. 4. Percentile curves of the body weight of girls between the ages of 3—19

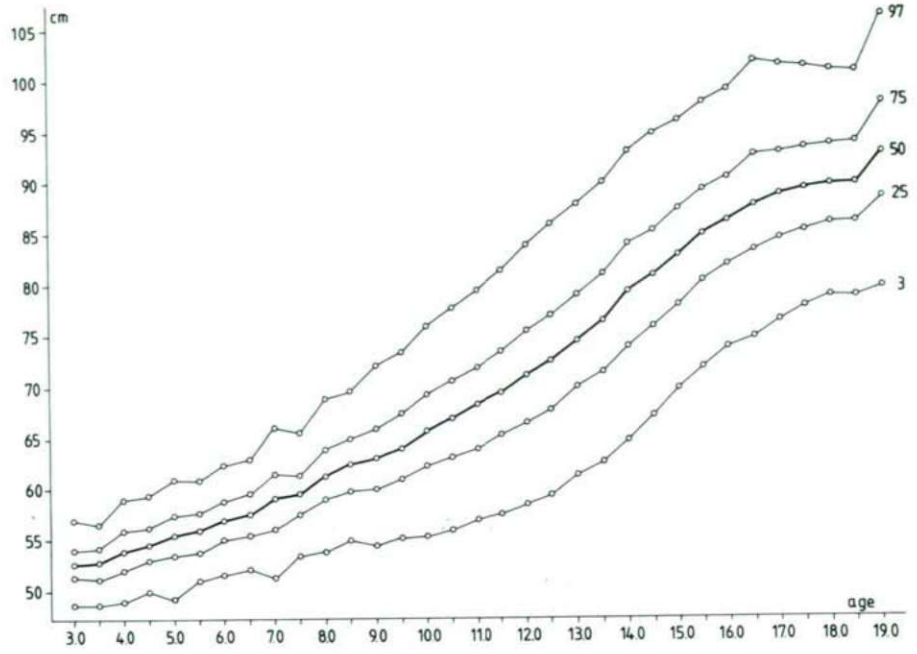

Fig. 5. Percentile curves of the normal chest circumference of boys between the ages of 3—19

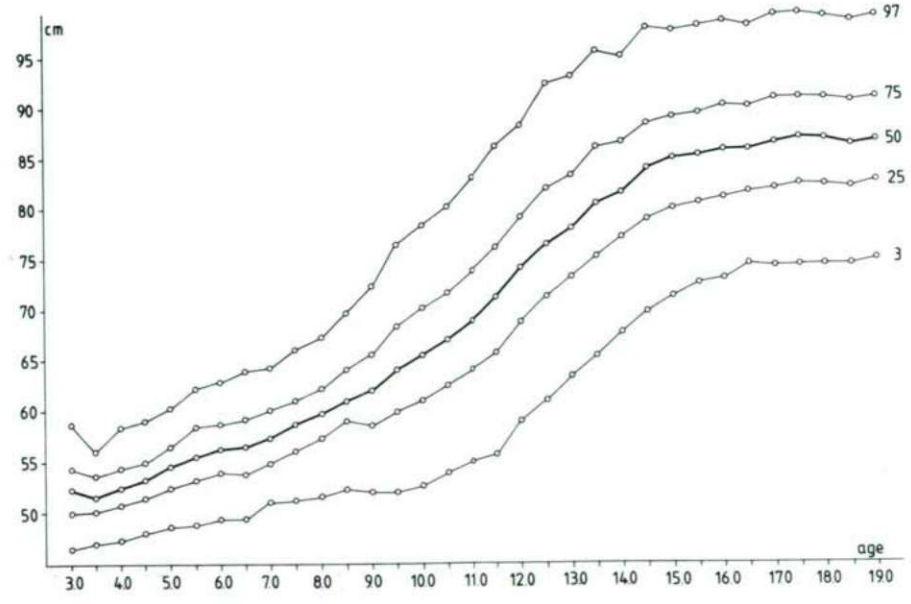

Fig. 6. Percentile curves of the normal chest circumference of girls between the ages of 3—19

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